TRANSCODING ACTION: EMBODYING THE GAME

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ABSTRACT

While playing a video game, the player-machine interaction is not solely characterized by constraints determined by which sensors and actuators are embedded in both parties, but also by how their actions are transcoded. This paper is focused on that transcoding, on understanding the nuances found in the articulation between the player's and the system's actions, that enable a communication feedback loop to be established through acts of gameplay, a process that is established with actions of the player aimed at the system and with actions of the system aimed at the player. We propose six modes of transcoding that portray how the player becomes increasingly embodied in the system, contemplating the moment where the player's representation in the system is substituted by her own actual body. This ongoing study aims at an understanding of the relationship between the interactant and the system's operations, raising the awareness on how the former's organic body and the latter's hardware are entangled in a communication process that allows the system as a whole to develop. This cybernetic relationship shapes our interactions and its relevance goes beyond the scope of video games, being found in all sorts of interactive media.

PERFORMANCE: PLAYER AND PROXY

Diverse hardware components have been combined throughout the short history of video games in order to provide multiples ways of interaction between the player and the game system. From that, several interaction devices were born. Some became obsolete or out of fashion. Others prevailed and even became ubiquitous. While operating those devices and depending on their particular characteristics, the player performs specific actuations that may vary in terms of amplitude, speed, rhythm, etc. These may include more than gestures, such as sounds or speech and even actions that are less controllable or perceptible such as those that derive from the autonomic nervous system. [1] But disregarding their kind, we may say that, while operating an input device, the player manifests her actions through her body and those manifestations compose a sort of performance. And it is this performance that is monitored and interpreted by the game system, registering very specific data that is subordinated to the diverse kinds of input devices that are in current use.

By operating those input devices the player interacts with the game world. In some games, for the player to act in the game world, she needs to control a game element that serves as her proxy. This proxy is her representation in the game world. It is not necessarily her representation in the story of the game. The player's proxy is the game element she directly controls and with which she puts her actions into effect. It is her surrogate, an actor. [2] With this in mind, her proxy can be her avatar, the playable character she tries to incorporate, assuming its role in the narrative and in the game world itself. But may also be the arrow cursor that she manipulates by pointing and clicking, putting various functions in motion and even instructing her playable character or playable characters.

The player may also not necessarily be fixed to a single proxy. Some games allow the player to exchange control between diverse playable characters, as in *Thomas Was Alone (*2012) or even control them simultaneously, as in Brothers: A Tale of Two Sons (2013). But by being more attentive, we may notice that is also very common for the player to be able exchange control between playable characters and other elements on screen during play, such cursors, arrows and other gameplay elements usually featuring graphical representations. So, in the end, we may say that the relationship between the player and her proxy is more accurately characterized in the plural sense: the player and her proxies.

This paper focuses on the articulation between the performance of the player and that of the entities that serve as her proxies in the game world. In other words, it is about understanding how the player's actuations relate to the expressions of those that represent her in the space of the game, but it is also about comprehending when are those proxies dismissed and when does the game space incorporates the player's actual body. So, to conclude, it is important to stress that what is explored here is not only the relationship between the player and her playable character in the game world, but also between her proxies in game space.

SPACE: PLAYER AND GAME

In *A Casual Revolution: Reinventing Video Games and Their Players* Jesper Juul differentiates between 3D space, screen space and player space. [3] 3D space corresponds to the world space of a three-dimensional game. Screen space is the two-dimensional surface that is the screen itself. Player space corresponds to the physical space where the player is situated. Juul identifies these diverse spaces in casual games, stating that "video games started out as two-dimensional games on screen space, became windows to three-dimensional spaces and now with casual games we see many games returning to both the two-dimensional screen space and to the concrete, real-world player space of the players."

Taking these categories into consideration, we discerned two kinds of space that the game system and the player are involved in while playing: player space and game space. Player space is, as Juul defines it, the physical space where the player resides. The player's physical body can never leave this space, as it is intrinsic to its very own existence. Player space also envelops the hardware necessary for the player to play, whether they are input or output devices, such as game controllers and screens, respectively. It may also enfold other players' actual bodies, which may eventually

interact with each other while playing but out of the scope of the game's game space. For example, in local multiplayer games, such as Super Mario Kart (1993) communication is also established in player space and outside of the realm of game world itself. Players talk, yell, laugh, etc. and even come in direct contact with each other. With this in mind, player space not only is where players actuate but also where they may eventually interact with each other outside of the game world. Game space is the space where the actual game world is. Whether it is one-, two- or three-dimensional; whether it is viewed through large or small screens or even virtual reality goggles; whether it is portable or not; whether it is listened through headphones, loudspeakers or simply doesn't feature sound at all, the game space is where the player engages in play, it is the space she is driven to inspect while playing, discovering its residents, characters, objects, locations, events, etc.. In sum, game space is where the game actually happens.

Game space is commonly represented in audiovisual terms, but other and diverse modalities are often combined with the intent of immersing the player into the game world. This necessity for immersing the player in game space has been increasingly noticeable over the years. Game technology commonly favors some modalities, such as visuals, in detriment of others, such as audio or haptics—something that is discernible by the increasingly investment in graphics over the past decade. Notwithstanding this asymmetry in the development of game technology, game space may incorporate many elements of the physical world, as we will see ahead.

TRANSCODING MODES

Transcoding can be clarified as the conversion process from one coded form of representation to another. In video games the information that is transmitted in a feedback loop between the player and the game system results from the sensorial, interpretative and actuative capabilities of each. The term *transcoding i*s thus used in this context to illustrate how do the actual actuations of the player realized in player space are represented in the game space.

We have briefly explored this concept in the past. [4] However, in this paper we present a revised and expanded version on the phenomena of transcoding featuring a more suitable and deeper arrangement along with new modes. The proposed modes of transcoding are divided in two major groups: intangible, exploring diverse modes of articulation between the player and her proxy in game space, and tangible, inspecting diverse relationships between the now merged player and game spaces. It is important to notice that these modes of transcoding are transversal to diverse kinds of representation, whether the game is based on simulation or not.

Intangible: Game Space ≠ Player Space

Intangible transcoding occurs when player space and game space are separate, when they are apart. In this case, the player needs at least one proxy in game space in order to act in the game. The player actuates in player space and, by means of the most diverse forms of input available, the game system registers and transcodes her actuations to her proxy, which, on her behalf, acts in game space. So, as the relationship between player space and game space is intangible, so is of the same nature the relationship between the player and her proxy. We propose three modes of articulation between the player and her proxy that feature an intangible transcoding. These are regulated by principles of similarity or similitude, from arbitrariness, to symbolism, all the way to mimicry.

Arbitrary articulation

An arbitrary articulation between the player and her proxy occurs when there is no direct correlation between their actions. And due to that arbitrariness, the player is usually subjected to instruction, learning even the simplest procedures in order to play the game. Even trivial routines such as moving, walking or running may require the player to be instructed or to learn by trial and error, on how they are performed.

In this kind of articulation the pressing of a button may correspond to potentially anything. Thus the player cannot play properly or at least as intended, until she learns what every push button, knob or other input device does. This kind of articulation is usually established according to norms and conventions – many of them seeded by classic gameplay mechanics – that are imposed by the game system. In fact, we may say that the shape of contemporary game console controllers is the result of years iterating hardware with the intent to improve the articulation between the actuations of the player and her proxy in game space – although some try to break with the current trend, such as the Wiimote[1].

So, in games like *Super Mario Bros.* (1985) the player doesn't need to actually jump to make Mario (the playable character) jump. And the same happens in *Super Street Fighter II* (1992) where the player doesn't need to actually perform a kick for her playable character to kick. The player only needs to press the corresponding push button on the game controller. It is this divergence in the actuation of the player and that of her playable character – her proxy – that reveals the nature of this kind of transcoding; a relationship that, in this case, we classify as arbitrary. We may find an interesting example in *Pong* (1972) – in which the graphic elements are of a more abstract nature –, where the player rotates a knob in order to move a paddle up or down. Rotating a knob bears no resemblance whatsoever to the movement of the paddle, a movement that consists of translating up and down along the screen – the game space. They are apparently unrelated as the nature of the player's actuations and the actions of paddle diverges. But, if the movement of the paddles consisted of rotation instead of translation, the articulation between them would be different, as the actuations of both the player and the paddles would be more similar, more related. But in this case, their articulation is forced.

Despite this arbitrariness, the game system doesn't need to expose and instruct the player on all input procedures. The fact that they are hidden may drive players into exploration and their discovery may grant status, bragging rights and even prolong the longevity of the game. At the end of each fight in *Mortal Kombat* (1992) the winning player is granted a very brief opportunity to gorily kill the loser's playable character with a special move called 'fatality.' The execution of this move is not necessarily easy, as the player needs to press a very specific combination of buttons/keys in a very strict and timely fashion (combo). Each character possesses its own fatality move and each move is enacted by a different combo. These combos are not taught by the system, nor they are made very evident or intuitive. Actually, back then it was pretty common for players to write down the combo, to avoid forgetting it. And much of this information mainly circulated outside of the game itself, in magazines and through word-of-mouth. So, their counter-intuitiveness, their somewhat complex performance, their difficult memorization and the limited time span and opportunities in which the players could perform them contribute to their inaccessibility. And it is this hiddenness that often and also elevates their desirability.

In sum, an arbitrary articulation can be accomplished either by *revealing* the input procedures and *instructing* the player; or by doing the opposite, *hiding* input procedures and instigating the player to *explore*, in a process of discovery by trial and error.

Symbolic articulation

"Through the use of simple gestures like quarter turns or moving to the left or the right with the analog stick, the game creates a deeper connection between the character's in-game actions and the real-world actions of the player playing the game. Although the player's motions are still abstractions of the in-game actions they invoke, the deeper connection formed between them is surprisingly powerful." [5]

A *symbolic articulation* occurs when there is a partial correlation between the player's performance and that of her proxy in game space. Although their performances are not exactly the same, they are similar, they are analogous, they bear some resemblance or at least suggestiveness or even complementarity. We can find again an interesting example in *Super Street Fighter II* (1992). For the player to execute the *hadouken* (a surge of energy that is shot towards the direction the playable character that invoked it is facing), controlling either *Ryu* or *Ken* (two playable characters), she has to perform the following combo: move the joystick or the d-pad a quarter of a circle, starting from down and followed by the 'punch' key (↓, □, →, punch), in a single swift move. Although occurring at very different scales, this movement is similar to the movement that is performed by the player's avatar, where first it crouches a bit and then thrusts forward with its arms shooting the energy ball. In the same game, jumping is attained by pressing the 'up' key, crouching is done by pressing the 'down' key and moving by pressing the 'left' or the 'right' keys, respectively. The arrangement of these keys on the gamepad and some keyboards is done respecting this spatial logic, where the 'up' key is placed at the top, the 'down' key at the bottom and the 'left' and 'right' keys are placed at the left and at the right, respectively. There is also here a symbolic articulation regarding the arrangement of these keys and their functions in the game world and, consequently also with the implicit movements of the player when executing those actions, either by moving the joystick or the d-pad up or down, to the right or to the left.

In *Metroid: Other M* (2010), the player has a third person perspective side view of the game space, while holding the game controller sideways. But when she rotates the controller pointing it at the screen the perspective of the game space changes to first person, allowing her to closely inspect the surrounding environment. This creates a symbolic articulation between the player and one of her proxies – the camera.

Fahrenheit (2005), *Heavy Rain* (2010), *Beyond: Two Souls* (2013) and *Asura's Wrath* (2012) often prompt the player for specific input that symbolically relates to the actions being performed on screen. Whether for punching, evading or other countless actions the player is instructed to follow the movement of her playable character with the analog sticks or even with the entire game controller, in a timely fashion. After the tutorial levels in *Beyond: Two Souls*, occasionally, the game the doesn't even present non-diegetic information to inform the player what to do in order to succeed or even that her input is required, e.g. take into consideration the fighting sequences where the player needs to follow the movements of *Jodie* (a playable character) with the game controller's analog sticks to attack or to avoid opponents.

Mimetic articulation

When the player's proxy imitates the player's performance, when their actuations are homologous their articulation is *mimetic*. The player's actuations are mapped and reproduced by her proxy in the game space, with diverse degrees of fidelity that depend on the diversity and granularity of the sensors used to monitor the player. As mimetic articulation regards the movement of the player's body, computer vision, accelerometers and similar resources commonly used.

In *The Legend of Zelda: Skyward Sword* (2011) when the player raises her arm holding the game controller, her playable character raises its sword. When the player swings her arm, that character swings its sword. Due to the mimetic articulation established in this game, fighting is a very physical activity and consequently may get pretty tiresome after a couple of hours playing the game.[2] Games like *Wii Sports* (2006), *Dragon Quest Swords: The Masked Queen and the Tower of Mirrors* (2007), *Heavy Rain: Move Edition* (2010), *Red Steel 2* (2010), *Kinect Star Wars* (2012), *Puppeteer* (2013) are also similar examples. At a smaller scale, in *Tearaway* (2013) the player is able to touch the rear touch sensitive panel of the PlayStation Vita – the supporting

portable game console – to give the impression that her fingers are emerging from the ground in the game world, interacting with the characters and the environment. Here the representations of the player's fingers on screen directly map her own actual fingers' movement. "[P]erformative games […]emphasize a physical response that requires the cybernetic integration of the games' challenges into the players' cognitive, kinaesthetic and perceptual functions." [6]

This also happens when playing *Pong* (1972) using a trackpad as a game controller. The players slide their fingers up and down in order to move the paddles also up and down in game space. In this manner, we may also consider that the movement of the players fingers is being mapped and reproduced in the motion of the paddles. Juul enunciates that "[m]imetic games move the action to player space." [3] In our model mimetic games possess an intangible articulation, due to the fact that the player still acts by proxy in the game world, whether that proxy is a character or a simple arrow cursor. But these games are, in fact, on the threshold of tangibility.

Tangible: Game Space = Player Space

Tangible transcoding occurs when the player space and the game space are the same. This means that the player's body is fully or partially embed in the game space. As a consequence the player's proxy in game space is dismissed as her own body now acts within it. Where intangible articulations are regulated by principles of similitude, tangible transcoding is not. Here a paradigm shift occurs, as there is no need to articulate the player and her proxy in the game space, because the latter is dismissed, thus veering the focus of transcoding from similitude to spatiality and physicality, to exploring not only the gestural amplitude of the player's actuation in relation to the scale of the game space, but also to the involvement of her physical body in that same space. This not only permits the player to act within the game space, but occasionally also allows the game space to act on the player herself. This questions the feeling of safety sensed by the players within the magic circle of the game. [7], [8] Where once the game was make-believe, it is now half-real. Not in the sense that Jesper Juul defines it as being caught between real rules and fictional worlds, but as being situated between fictional rules and real worlds, if you don't mind the wordplay. [9] Meaning that, because the game space and the player space are the same, real dangers and challenges of the actual physical world apply. Things that may have not initially been contemplated in the game itself and that may go from encountering unfriendly people or animals, to trespassing private property, to diverse physical injuries when risking reaching unsafe locations or performing diverse or unnatural body movements or poses.

The system itself may also injure the player. One example is the *Painstation* (2001), where the players are physically punished. This game consists of a variation of *Pong* (1972), where each of the two players controls a paddle trying to avoid the ball from hitting their goal. If the ball hits the goal, going beyond the paddle and hits one of the bricks that rest there, the player is punished. Each brick represents a different punishment: electroshocks, heat and whippings. The punishment is applied on the players' left-hand, that rests on a specific platform. If the player removes her hand from that platform, she looses the game. The *Painstation* website even featured an image gallery called the "hall of pain," presenting images of the players' injured hands.[3]

Another example may be found in *Metal Gear Solid* (1998). Already deep into the game, there is a moment where Snake (the playable character) is caught by the enemy and tortured. To resist torture and to avoid the character's life bar energy from draining to death the player has to quickly press specific button on the game controller for increasingly longer periods of time. The player may also submit to the enemy at any time by pressing another specified button. This is a decisive moment, in which resistance and submission bear significance to the final outcome of the game and failure means game over.[4]

So, after a while the player gets a bit exhausted with a minor sore arm due to the stress of continuous and rapid pressing of that button. In-between torture sessions, Snake is taken to a holding room. There, Naomi – another game character – communicates with him by means of a hidden device. Snake then tells her that his arm hurts, to which she answers by instructing him to place the game controller on his arm. The game 'breaks the fourth wall' here, as Naomi is actually talking to the player and not the game character. And as the player follows those instructions, the game controller starts to vibrate, massaging and relaxing her actual physical arm.[5] In essence, the following examples explore a relationship between game space and player space focused on the involvement of the players' body in the game, from smaller and finer movements that require a partial involvement of the player's body, to ampler ones that demand a full body involvement, all the way to the indispensable need for the player to travel, as that involvement becomes geographic.

Game Space < Player Space

Games that resort to natural user interfaces become evident here, where the player establishes direct contact with the game world and its residents, exerting influence upon them. In *Fruit Ninja* (2010) the player slides her fingers across the screen, cutting the fruit that is thrown into the framing of the screen. Here, the player touches the visual representations of the fruit, cutting it. *Angry Birds* (2009) is another although simpler example, where the player pushes and aims the birds on the slingshot by also touching their representations on screen.

The game space in these examples is closer to what Juul describes as screen space, where the game happens in the actual two-dimensional space that is the screen itself. And although the two-dimensional plane of the screen (game space) is situated in the same space as the player space, what is important here is not

its two-dimensionality or even that both of these examples use touch sensitive technology, but they only require a partial involvement of the player's body when playing. The player only uses her hands, maneuvers her arms at most, to play these games, as the game space is much smaller than the player herself. In these cases, the game space is restricted to size of the screen.

But there is more to this kind of articulation than that. A tangible articulation means that players may actually touch each other, which may actually be an important component of the play experience itself. While playing *Fingle* (2012) the players need to follow the movement of several shapes that are represented on the screen, touching them and consequently intertwining each other's fingers, an experience that is of a rather physical and of a somewhat sensual nature. So, here touching the other player is essential to the experience, as certain types of movements and the resulting friction between both players' fingers and hands is the focus of the game. It thus raises the awareness that players are actually situated in play space, physically interacting with each other. In *Finger Tied* (2012), instead of following several elements represented on screen as in the previous mentioned game, the player needs to guide similar ones by dragging them with her fingers. It is usual for this game to force the player into making harsh physical movements, stressing the articulations of her hands and fingers. Here the experience is more aimed at dexterity, pliability and adroitness in solving the presented challenge, but nonetheless a felt physical experience.

Game Space = Player Space

When the game space and the player space possess an equivalent size, actions that involve the whole body are possible. In other words, if before we were focused on actuations that are contained to a portion of the body and that featured a finer degree of movement, here we are looking at actuations that are ampler and to gestures that express the involvement of the whole body.

Dance Dance Revolution (1998) is a dance/rhythm game in which the game controller consists of a platform with the coloured arrows laid out in a cross. In order to play, the player needs to step onto that platform and to hit the corresponding arrows with her feet, following the visual cues on screen that are accompanied by music. This kind of actuation involves the whole body of the player. As Juul states: *Dance Dance Revolution* "does feature a display, but most of the game's spectacle is in player space." [3]

One may say that if the player only needs to place her feet at the correct arrow in a timely fashion, the action is still focused on a part of her body – her feet or her legs at most. That may be true, but and in response, moving her feet or legs like that is an action that involves the body as a whole, finding balance while establishing rhythm, becoming a full body engaging experience, such as is dancing or even walking. But with that discussion in mind we may find another and more straightforward example in Johann Sebastian Joust (2010). This is a game with no video feedback in which each player is given a motion controller. Players have to avoid the controller from registering sudden movements, remaining still when the music is playing slowly and trying to jostle other players' controllers while the music fastens its pace, as the tolerance threshold is less strict then. The last player standing wins. The game space of this game envelops the players' whole body, as they have to move around, avoiding attacks from other players and finding balance when attacking.

Game Space > Player Space

Location-based games are games that depend on knowing the location of the player, tracking them along with other game elements. These games usually force the player to travel in order to play. So, here game space not only envelops the player's body, but the geographic space she inhabits as well. As a consequence, these games need to be fairly mobile, usually relying on GPS technology in order to track players' locations and on augmented reality features to provide information of the surrounding environment. *Ingress* (2013) is a location-based massive multiplayer game in which players choose to belong to one of two factions: *The Enlightened* or *The Resistance*. Their goal is to claim portals that either belong to the opposing team or are unclaimed. These portals are spread across the planet and, in order to find them, players have to travel to their geographic locations. In *Ingress*, we may say that the dimension of the game space is potentially as big as the planet Earth itself. As it features such a massive scale, the player is forced to travel. The focus of this game is not to monitor the players' movements per se, but their geographic locations. That is what makes the game progress.

Coderunner (2012) is another example where the player, acting as a spy, has to travel to specific locations in order to play the game. Here the player has to leave and retrieve intelligence files without meeting anyone, something known as a dead drop. To create a dead drop the player has to choose a location, mark it on the map, protect it with a password and point to or plant a clue in the environment so that other players can access it. So accessing a dead drop not only means that the player has to travel to its location, but also to unveil what is behind the clues, inspecting the actual surrounding physical environment. In fact, at its official website it is said that "[t]he *REAL WORLD* is the game map!"[6] That statement clearly demonstrates the fusion that exists between player space and game space.

CONCLUSIONS AND FUTURE WORK

We are aware that a single video game may put to use several of these modes of transcoding across diverse moments of gameplay. We cannot thus make the claim of being able to make a mutually exclusive classification. But we can, however, state that some video games assume one of these a predominant type of transcoding throughout the game and also that we are able to discern them in specific gameplay moments. Nevertheless, questioning on how these modes work together is necessary for figuring out what kind of dynamics they promote and how these

affect the experience of play. Something that is crucial in subsequent research studies.

Also, exploring asymmetric gameplay using different types of transcoding in multiplayer games may also reveal relevant data, probing the relationship between similarity, disparity and complementarity, affecting the dynamics of play and eventually its relevance to the unfolding narrative. We are also considering subsets for each of these types of transcoding. Finding, exploring and understanding variations featured in the diverse examples that represent each of these modes may also contribute to a better understanding of the dynamics of play and player experience.

ACKNOWLEDGEMENTS

This work is funded by FEDER through the Operational Competitiveness Programme – COMPETE – and by national funds through the Foundation for Science and Technology – FCT – in the scope of project PEst-C/EAT/UI4057/2011 (FCOMP-01-0124-FEDER-D22700).

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ENDNOTES

1. The Wiimote or the Wii Remote is the Nintendo Wii's game controller with motion detection capabilities.
2. Video games in the The Legend of Zelda series require the player to invest considerable amounts of time.
3. More info at http://www.painstation.de/.
4. At the time of writing, the Metal Gear Solid (1998) torture scene could be viewed at http://youtu.be/oHUi1TNNGD8.
5. At the time of writing, the in-game screening of this event could be viewed at http://youtu.be/cyOtFqvK-_U?t=30s.
6. More info at http://www.coderunnergame.com.